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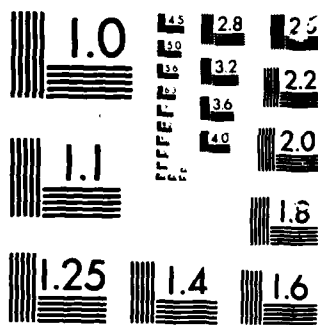
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**METHODOLOGY FOR GENERATING EFFICIENCY AND
EFFECTIVENESS MEASURES (MGEEM): A GUIDE FOR
COMMANDERS, MANAGERS, AND SUPERVISORS**

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19. ABSTRACT (Continue on reverse if necessary and identify by block number) The Methodology for Generating Efficiency and Effectiveness Measures (MGEEM) is a multi-step procedure which permits the creation in any organization of a complete productivity measurement system. This is one of two technical papers (TPs) on the MGEEM. It provides an overview of the MGEEM process and identifies anticipated benefits, costs, and risks for the Air Force commander, manager, or supervisor contemplating its use. The companion TP, Implementing MGEEM: A Manual for Air Force Measurement Facilitators, provides sufficient technical detail to guide a measurement facilitator through the operational use of the procedure. In a target organization, the MGEEM process begins when a measurement facilitator uses a structured group technique to bring about consensus among the commander (manager or supervisor) and his/her immediate subordinates concerning the organization's principal intended accomplishments, called Key Result Areas (KRAs). In the second step, the facilitator again uses a structured group technique to bring about consensus among another group, the commander's immediate subordinates and selected members of their immediate				
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subordinates, on the question of what the commander needs to know to determine how well the organization is doing on each KRA. The answers are called indicators. An example of a KRA and indicator is, for a repair shop, quality of repair and quality control inspections passed. In the last step in the process, computerized indicator data are periodically reported to workers according to the principles of feedback, goal setting, and incentive systems. Field tests of the MGEEM show that the process is acceptable to participants, that the resulting productivity measurement system is judged by commanders to be sufficiently comprehensive, that the process is cost effective in that indicators can usually be formed from existing data, and that the system makes significant improvements in organizational productivity.

The MGEEM provides many advantages to commanders including (a) identifying key objectives of the organization, (b) providing measures for each objective, (c) measuring overall as well as components of organizational productivity, (d) identifying priorities for increasing productivity, (e) assisting in allocating resources, (f) identifying problems before they become serious, and (g) showing when problems are fixed. Advantages to workers are also numerous and include (a) being fully acceptable since workers have an input to the system's development, (b) making clear what is expected, (c) showing current status, (d) showing the results of efforts (feedback), and (e) providing a basis for incentives.

Numerous applications in government and industry show that the MGEEM requires the time and continually strong support of the commander/manager/supervisor. Risks associated with its use, which include possible misuse of measurement data, shifts in resources to activities that are being measured, and anxiety of personnel about the measurement of their performance, can be reduced with the judicious use of the process.

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SUMMARY

There is evidence that commanders and managers in many Air Force organizations are not fully satisfied with existing procedures for measuring organizational productivity. Productivity measurement and enhancement research and development (R&D) has recently culminated in a significant breakthrough to solve this problem: A series of technologies called the Methodology for Generating Efficiency and Effectiveness Measures (MGEEM), which permits the creation, in any organization, of a complete productivity measurement system.

After becoming familiar with a target organization, a measurement facilitator begins phase one of the MGEEM process by convening a meeting of the commander (manager or supervisor) and his/her immediate subordinates. This group is confronted with the question, "What does the Air Force pay this organization to do?" Consensus on the answers, called Key Result Areas (KRAs), is developed through a structured group process. Phase two involves a meeting with the commander's subordinates. For each KRA, the measurement facilitator asks what the commander needs to know to determine how well the organization is doing on this aspect of the organization's productivity. Consensus on the answers, called indicators, is again developed through a structured group process. Examples of KRAs and indicators are: (a) for a repair shop, quality of repair and quality control inspections passed; (b) for a personnel office, timely and effective staffing of positions and percentage of positions filled; and (c) for engineering, customer support and percentage of work orders accomplished. Field tests in 24 Air Force organizations showed that these two phases of the MGEEM are acceptable to participants, produce a productivity measurement system judged by commanders to be sufficiently comprehensive, and are cost effective in that the indicators can usually be formed from existing data. In the third phase of the MGEEM, computerized indicator data are periodically reported to workers and managers according to the principles of feedback and goal setting. These principles have to do with issues such as the frequency and objectivity of feedback and the acceptability, difficulty, and feasibility of goals. A comprehensive field test of the complete MGEEM system with feedback in five organizations of the 67th Tactical Reconnaissance Wing showed improvements in organizational productivity of from 35% to 50%.

Evidence shows that the MGEEM requires the time and continual strong support of the commander. Possible risks associated with its use include misuse of measurement data, shifts of resources to activities that are being measured, and anxiety of personnel about the measurement of their performance. Suggestions are made for the judicious use of the process to reduce these risks.

This is one of two technical papers (TPs) on the Methodology for Generating Efficiency and Effectiveness Measures (MGEEM), a multi-step procedure by which a complete productivity measurement system can be created for any organization. While the companion TP, Implementing MGEEM: A Manual for Air Force Measurement Facilitators, provides sufficient technical detail to guide a measurement facilitator in the actual operational use of the MGEEM, the current TP provides an overview of the MGEEM process and identifies the anticipated benefits, costs, and risks for the Air Force commander, manager, or supervisor contemplating its use.

PREFACE

This is one of two final technical papers from Task 13, Technology Transfer Plan and User Manuals for the Methodology for Generating Efficiency and Effectiveness Measures (MGEEM), for Contract No. F33615-83-C-0030, Contributive Research in Manpower and Personnel Technologies. The other technical paper is, Implementing MGEEM: A Manual for Air Force Measurement Facilitators. Both technical papers are user manuals for the MGEEM. The conceptualization and field test of the MGEEM are documented in AFHRL-TR-81-9, Productivity Measurement Methods: Classification, Critique, and Implications for the Air Force, and AFHRL-TP-84-54, Field Test of the Methodology for Generating Efficiency and Effectiveness Measures.

The authors wish to express their appreciation to Lt Col Arthur R. (Bob) Dahms, III of the Productivity Office of the Requirements Division, Directorate of Manpower and Organization (HQ USAF/PMRE). Col Dahms reviewed the manuscript and made valuable comments which enhance its relevance for Air Force users.

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METHODOLOGY FOR GENERATING EFFICIENCY AND
EFFECTIVENESS MEASURES (MGEEM): A GUIDE FOR
COMMANDERS, MANAGERS, AND SUPERVISORS

1.0 INTRODUCTION

1.1 Who Should Read This Manual?

If you can answer "yes" to the following three questions, you will benefit from this manual.

- a. Are you the commander or manager of an Air Force organization?
- b. Would you like to improve the efficiency and effectiveness of your organization?
- c. Would you like to increase the commitment of the people in your organization toward the unit and its mission?

Although the Methodology for Generating Efficiency and Effectiveness Measures (MGEEM) is primarily directed toward helping Air Force managers, it is fully consistent with priorities established by the Commander-in-Chief and with Air Force regulations. In a memorandum to the heads of Federal executive agencies, President Reagan (1985) stated his view of the importance of productivity improvement to the nation:

. . . I have asked the Congress to demonstrate its support for a government-wide program to improve Federal productivity by passing a joint resolution declaring productivity improvement as a national goal.

Air Force Regulation (AFR) 25-3, Air Force Productivity Enhancement Program (PEP), established productivity improvement as a priority in the Air Force. This regulation properly acknowledges the fact that responsibility for productivity improvement in Air Force organizations rests squarely on the shoulders of managers:

Using resources in the most efficient and effective way possible to accomplish an assigned mission is a manager's primary responsibility. Meeting this responsibility with today's limited budgets and expanding mission requirements places a premium on management excellence. Productivity growth is essential if we are to meet these management challenges, and a systematically developed program is just as essential to achieving that growth. (AFR 25-3, 1982, p. 2).

The MGEEM is an important part of a "systematically developed program."

But President Reagan's proclamations and hundreds of lines of Air Force regulations will not make productivity enhancement occur in the Air Force. It will happen only if people like you decide to make it happen and become committed to this goal. If you are truly interested in making your organization the best it can be, this manual will be a valuable tool. It is not a panacea, and it contains no cook-book solutions. It will take work, persistence, and continuing, visible support from you. The only guarantee is the knowledge that you will be doing the best you can as a steward of the public resources assigned to you. Perhaps even more importantly, you have the opportunity to bring forth the best performance possible from the other people in your organization. Of course, if the result is that your organization's performance improves, you will receive the additional recognition. However, ultimately, for most Air Force managers, it is

pride in doing a good job that drives them to carry out the types of day-to-day effort that make the MGEEM and their organization fully successful.

1.2 What Will You Learn From This Manual?

1.2.1 Measurement is a Key to Productivity Management

"What you measure is what you get" is more than a catchy phrase. It is an accurate description of the role of measurement in the management process. When the wing commander begins to track missed appointments at the base dental office, the number of missed appointments goes down. When field grade officers stand at the gate and observe the number of vehicle occupants who wear seat belts, the number of people "buckled up" rises. Measurement gets results. However, there are costs associated with measurement, and measurement carries with it certain risks from the standpoint of managers and commanders in terms of who gets the data and how the data are used. The MGEEM is designed to minimize these risks and to be a cost-effective method for use by an organization to define key indicators of efficiency and effectiveness. This manual will serve as a tool to help you, as a commander, to decide if this tool can benefit your organization.

1.2.2 What is the MGEEM?

The MGEEM is a multi-step procedure which leads an organization through the process of defining and prioritizing its principal intended objectives. Once its principal intended objectives or Key Result Areas (KRAs) are defined, the organization identifies indicators which can be used to signal whether the KRAs are being accomplished. In developing the indicators, the procedure makes use of input from those whose productivity is being measured. A principal component of the MGEEM is a structured group process called the Nominal Group Technique (NGT) -- a combined brainstorming, voting, and discussion technique which efficiently promotes group consensus. The NGT is widely used in both public and private sector organizations to generate productivity indicators. Once indicators have been defined, they are reviewed and operationalized in a management information system. The MGEEM draws upon research on feedback and goal setting to suggest ways in which indicators can be used to enhance productivity and the quality of working life.

An analogy serves to clarify the role of the MGEEM in the organizational productivity improvement process. Figure 1 depicts the Productivity Analysis Model developed by the Air Staff Productivity Office (AF/PRME). This model points out that the manager can control all or some of three categories of factors in his/her efforts to manage productivity. These are: mission, people, and the methods by which the mission is accomplished. In the center of Figure 1 is a dial which indicates the level of productivity change. In the same way that an aircraft commander monitors the dials and gauges on the aircraft instrument panel to control the aircraft, an organizational commander needs a set of dials and gauges to monitor and control the organization. However, few organizations have a satisfactory "instrument panel" that provides the commander with the information needed to manage productivity. The MGEEM provides a way for the organization to build that instrument panel in a participative fashion. By involving members of the organization in the process, it ensures that they will understand the measures, believe in them, and work to help make them better. A measurement system that is widely accepted can provide the basis for application of the basics of management: planning, organizing, goal setting, feedback, controlling, and reinforcement.

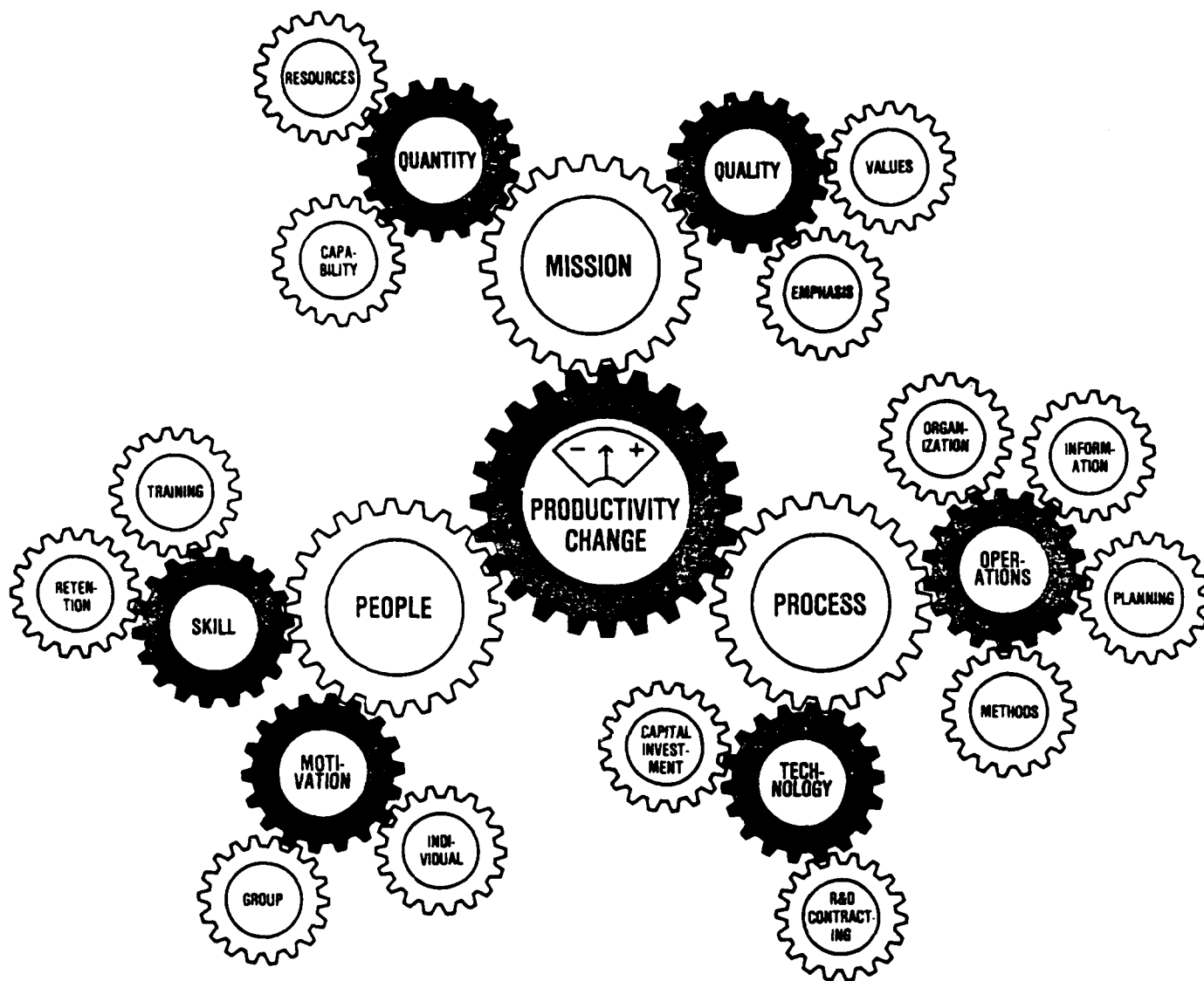


Figure 1. Determinants of Productivity.

1.2.3 Benefits of MGEEM

In addition to the intrinsic benefits identified in Section 1.1, why should an Air Force commander be concerned with a methodology to generate measures of efficiency and effectiveness? The answers to this question fall into two categories: offense and defense. "Offensively" minded commanders can use productivity measures not only as a tool to gauge mission accomplishment, but also to help them compete more effectively for limited resources. Commanders who embrace productivity measurement and actively seek methods improvement are more likely to have high performing organizations. Outstanding organizations, in turn, are apt to receive the favorable recognition which will enhance career potential for the commander and his/her personnel. From a "defensive" point of view, an active productivity improvement effort can help organizations prepare for inspections, provide evidence to justify budget projections, and comply with Air Force and other management headquarters' productivity goals.

There are many arguments to support the use of the MGEEM. However, the decision comes down to the extent to which you, as commander or manager, desire to make your organization more efficient and effective. If you sincerely desire to help your organization improve, not for personal gain, not to "cover your six o'clock position," but because you feel it is the right thing to do, you are very likely to succeed with this technique.

1.2.4 MGEEM Field Test Results

The MGEEM has been field tested in 24 Air Force organizations. The field test revealed that the method produces a manageable number of indicators for an organization, is acceptable to participants, and is cost effective; i.e., most indicators defined can be generated from existing data in the organization. Furthermore, the field test demonstrated the applicability of the MGEEM to organizations of varying types (e.g., weather detachments, jet engine maintenance branches, and base administration divisions).

1.2.5 Reactions of Air Force Personnel to the MGEEM

Following the field test in their organizations, commanders were asked to comment on the process. Some of their reactions are listed below.

"The process was extremely beneficial to the people -- whole unit, now participants. I expect morale to improve even if no changes are made. This, plus the feedback, are key benefits."

"Overall, an excellent session!"

"The approach was sound and refreshing."

"We served to prove that the book may be right."

Reactions from enlisted participants were also quite favorable:

"Am enthusiastic about the procedures used in the measurement process because they opened our eyes to the duties, requirements, and needs of the other sections in our Division. The manager/supervisor/technician exchanging ideas in this type of atmosphere seems to be very healthy for all of us."

"Helped me gain insight into the overall branch mission and some of the problems incurred. Also, by participating in the process, I gained a feeling of having my views considered by higher headquarters."

As these reactions suggest, the MGEEM is much more than a process to generate KRAs and indicators. It is that; however, the process also focuses the attention of people in the organization on their common purpose. The results are beneficial, but so is the process.

Will the MGEEM help your organization? This is a question that only you can answer. Hopefully, this manual will help you make that decision.

1.3 Overview of this Manual

Chapter 2 briefly discusses some basic concepts underlying the application of the MGEEM, including a description of the system's view of organizations, basic perspectives on productivity measurement, and the characteristics of an ideal measurement system. Chapter 3 describes the phases of the MGEEM process. The process is described in terms of decisions the commander/manager has to make in order to implement the MGEEM in his/her organization. Chapter 3 also includes a statement of anticipated benefits, costs, and risks and concludes with some of the pitfalls to be avoided in an MGEEM implementation. Chapter 4 presents examples of indicators that have been generated for use in a wide range of organizations.

2.0 BASIC CONCEPTS UNDERLYING THE MGEEM

2.1 Productivity in Air Force Organizations

2.1.1 Introduction

Understanding productivity in Air Force organizations requires that one envision the organization as a "system." This section discusses some basic system concepts that are fundamental to the understanding of productivity and to the use of the MGEEM. Managers who are already familiar with the system's view of organizations may want to skip to Section 2.3.

2.1.2 Basic System Concepts

A system is a set of interrelated components that have a common purpose or goal. An Air Force organizational system might be a wing or a squadron or even a small work team within a squadron. Systems can be small or large; however, they all have a set of interrelated components (e.g., people, material, equipment, organizational entities) that share a common mission.

Systems can be defined in terms of their inputs, outputs, goals, and interactions with their environment across system boundaries. Let's examine these concepts for a military organization, for example, a communications-navigation (Comm-Nav) branch in an avionics squadron. This branch performs maintenance on the on-board communications and navigation equipment carried by aircraft in the wing.

2.1.2.1 Inputs. As a general rule, inputs to an organization can be classified according to the categories shown in Table 1.

Table 1. Categories of Inputs

Labor	Number of hours worked
Materials	Number of pieces, number of units, dollar value, etc.
Capital	Number of dollars invested, depreciation value of assets, etc.
Energy	Number of kilowatt hours used, number of gallons of fuel, etc.

For the Comm-Nav branch, labor inputs consist of the total number of assigned personnel multiplied by the number of duty hours in the period under consideration (e.g., week, month). In certain cases it may be desirable to adjust the total labor input for such factors as personnel on temporary duty (TDY), on detail to other units, on leave, etc., to arrive at a total number of "available" hours. While such definitions must be explicitly agreed upon, labor input is typically defined in terms of the number of hours spent by designated personnel during a given time period. In most military organizations, the most significant input is labor.

A second input category for the Comm-Nav branch is materials. In order to perform the mission, personnel must be supplied with spare parts, expendable items (e.g., non-capitalized tools and equipment, office supplies). Typically, the common scale for materials is dollars. Depending on the accounting practices of the unit, item values can be expressed in terms of initial cost or in terms of replacement cost.

A third category of inputs is capital. At the branch level, there tends to be little knowledge of the capital investment program opportunities or the process by which assets are capitalized. If you are involved with a wing or higher level organization, capital may have more importance. However, the unit of measurement for capital assets (buildings, major items of equipment, etc.) is units or dollars of depreciation. (Refer to AFR 25-3 for a description of Air Force capital investment programs.)

A fourth category of inputs is usually called energy. This category includes the electricity used to operate the facility, the fuel used to power vehicles or aircraft, and gas or oil used for heating. In the case of the Comm-Nav branch, energy will not be a very significant input. Perhaps the branch owns vehicles and can have an impact on the gallons of fuel used. It can affect the amount of electricity used or the energy required for heating its facilities; however, these energy matters are typically handled by a centralized resource management agency. When a single energy type is being considered, it is preferable to quantify energy in terms of physical units (gallons, kilowatt hours, etc.). However, when there is an aggregation issue, energy units are usually converted to dollars.

2.1.2.2 Outputs. A second major system concept is that of outputs. An output is a product or service which the system produces in order to achieve its purpose. In the Comm-Nav example, outputs would be pieces of equipment repaired, personnel trained, reports submitted to squadron headquarters, etc. Whatever the organization produces for use outside its own organizational boundaries is an output. A distinction is frequently made between "intermediate" outputs and "final" outputs. Intermediate outputs are those which are consumed by the organization itself or are necessary to produce final outputs. Final outputs are those that the organization exports across its boundaries to other organizational systems.

2.1.2.3 System Boundary. The boundary of a system differentiates it from its environment. While the concept of boundary is "theoretical," it has important practical implications. In defining the Comm-Nav branch as a system, where does one draw the line? For instance, is an individual who has been on detail to the squadron for 3 months within the system? Are the vehicles on permanent loan to the branch from the motor pool part of the Comm-Nav system or the motor pool system? Questions such as these must be addressed and answered in order to define unambiguously the system under investigation. Once these questions have been answered, the system boundaries become clearer. However, it should be noted from these examples that boundary issues deal both with space (e.g., area occupied by system components) and time (e.g., the length of time someone will be away from the organization before that person is no longer considered within the system).

2.1.2.4. Environment. Once the system is defined by specifying the boundaries, the environment has also been defined. Anything that is not part of the system is part of its "environment." Systems survive through transactions with the environment. Personnel resources, supplies and equipment, and energy to operate the system all flow from the environment. Relevant organizations for the Comm-Nav branch include the maintenance directorate, the avionics squadron headquarters, other branches in the avionics squadron, the supply organizations, and flight operations (since many of the branch's goals flow from equipment write-ups made by flight crews). Maintaining effective boundary relationships is a critical aspect of a system's operation.

2.1.2.5 System Diagram. These basic system concepts may be depicted in a systems diagram (Figure 2).

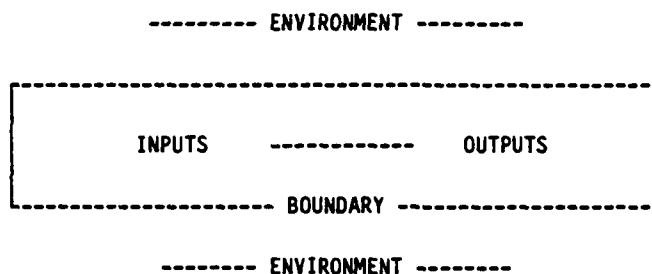


Figure 2. Systems Diagram.

As Figure 2 shows, a system is defined by its boundary, which separates it from its environment. In an open system, such as an organizational system, inputs are derived from the environment. The system uses those inputs to produce outputs which are exchanged with the environment. As this very simple analysis suggests, an organizational system must manage the process of converting inputs to outputs, but it must also manage its boundary relationships to assure a continuing flow of inputs. In most organizational systems, the flow of inputs is dependent on the extent to which the system outputs conform to the requirements of the environment (e.g., customers) with respect to quantity, quality, price/cost, etc.

2.2 Productivity -- A Systems Concept

Now that the basic components of an organizational system have been introduced, productivity can be defined. As applied to Air Force organizations, productivity has two components: efficiency and effectiveness. Efficiency is concerned with the quantity of inputs required to produce a given level of outputs. Effectiveness refers to the extent to which the outputs conform to mission requirements. These definitions are expressed in AFR 25-3 as follows:

Productivity. For this regulation, productivity is the measure of an organization's performance. It is not only "efficiency" (the ratio of inputs to outputs), but also "effectiveness" (to what extent the output satisfies mission objectives). Put another way, productivity is concerned with both doing things right (efficiency) and doing the right things (effectiveness). (p. 2)

2.3 Productivity Measurement -- A Tool for Improvement

2.3.1 Measurement is Not an End in Itself

Productivity measurement should be viewed as a tool for improvement. From the commander's perspective, the main reason to be interested in productivity measurement is to make productivity better. Measurement should be viewed as the first step in the management effort to enhance organizational productivity.

2.3.2 What You Measure is What You Get

Measurement of any aspect of an organization's performance sends signals throughout the organization as to what the commander views as important. Because of this impact of measurement, it is important to measure the right things. Since resources, time, and materials tend to flow from unmeasured to measured aspects of organization performance, we need to ensure that a productivity measurement system covers the key facets of an organization's mission.

2.3.3 Measurement Systems Fail If They Lack Acceptance

In order for a measurement system to be a productivity enhancement tool, it must be understood and accepted by users of the system. If not, users will find ways to avoid, fake, or otherwise "defeat" the system. Many elegant measurement systems imposed by headquarters or staff experts have failed because they did not gain acceptance by those being measured. One way to increase understanding and acceptance by the users of a measurement system is to involve them in its development.

2.3.4 Measurement is a Substitute for Direct Observation

When measurement for improvement is the goal, measurement can serve as a substitute for direct observation. An axiom that has guided military commanders through the years is to ensure that the critical aspects of performance are being carried out through inspection. In most organizations of any size, it is impossible for the commander to physically inspect all aspects of performance on an ongoing basis. Therefore, measurement becomes a substitute for direct observation. In addition, in Air Force organizations where products or services are intangible, measurement becomes a way that the efforts of organization members are made concrete and visible. In this way, measurement serves as feedback to allow members to know how well they are doing. This is a critical component of motivation for organization members.

2.3.5 Users of Measurement Data Must Understand Its Limitations

At best, productivity measurement is imperfect. It is subject to fluctuations sometimes beyond the control of the measured organization. Despite considerable effort, it is not always feasible to measure all aspects of performance in a formal way. Thus, productivity measurement data must be interpreted with judgment. For example, when the number of hours required to repair a jet engine increases for a reporting period by 20%, this will be understood by a unit commander who knows that five new enlisted mechanics, just out of school, joined the unit during this period. However, someone up the chain of command who notices this drop in efficiency might attribute it to other causes and take actions that are inappropriate.

2.3.6 Most Organizations' Productivity Can Be Measured

Given the time and resources, almost anything can be measured. However, the feasibility of measurement may be a different issue. Not all aspects of productivity that can be measured are worth the cost. Determination of measurement feasibility is ultimately a judgment of the commander. However, it is often difficult to determine the value of a particular measurement indicator until it has been tracked for a period of time. Therefore, managers are cautioned to reserve judgment about the feasibility of indicators until there are some data upon which to make a valid judgment.

2.4 Characteristics of an Ideal Measurement System

2.4.1 Covers Important Facets of the Mission

The ideal measurement system should include indicators which encompass the most important facets of the organization's mission. Measuring only a single aspect of the mission can distort resource allocation decisions and lead the organization to overly emphasize one aspect of its mission (e.g., quantity of work accomplished) at the expense of other facets (e.g., customer satisfaction or readiness).

2.4.2 Should Be Understandable

The measurement indicators and reports produced for commanders and members of the organization must be comprehensible. In order for the information to have value in guiding performance, users must understand how their performance is reflected in the numbers that are tracked.

2.4.3 Should Be Controllable

The indicators comprising the measurement system should be under the control of the organization being measured. This does not mean that the measured organization can make the numbers say what they want them to say. It means that if the organization does a better or worse job, the numbers should change accordingly. There should be a clear relationship between the performance of the organization and changes in the indicators. In other words, the indicators should be controllable by organization members through their performance.

2.4.4 Includes Indicators of Efficiency as Well as Effectiveness

A balanced set of indicators should include measures of the impact or outcome produced by the outputs of an organization and should reflect the resources consumed in producing the outputs. Experience with the MGEEM suggests a tendency for Air Force units to focus on effectiveness more than efficiency. This tendency should be counteracted by emphasizing the need to track resources consumed in relation to outputs produced (efficiency) as well as in terms of how well the mission is being accomplished (effectiveness).

2.4.5 Values Should Provide a Reasonable Dispersion

It does little good to track productivity indicators that never change. For example, an organization could track safety by monitoring the number of fatalities. However, fatalities are very rare events, fortunately, and, therefore, make poor criteria. A more useful indicator would be number of critical incidents or "near misses," since these are likely to occur more frequently.

2.4.6 Indicators Should Be Useful

Indicators used by an organization should reflect activities that the commander and members of the organization wish to track in the interest of improving performance. The items discussed above are examples of factors which affect usefulness. However, since costs are associated with measurement, an organization should track only those aspects of performance for which the value of the information outweighs the cost of measurement.

2.5 Evolution of the MGEEM

The MGEEM is a process for identifying productivity indicators that fulfill the criteria discussed above. The process was developed by adapting some of the best practices of industry and government. The MGEEM has been tailored for use in Air Force environments through discussions with commanders and field testing in 24 different Air Force organizations. The methodology was modified based on these experiences. The MGEEM reflects current thinking in the field of productivity management.

3.0 THE MGEEM METHODOLOGY -- A DESCRIPTION

Implementation of the MGEEM should be viewed as a series of steps along the road toward productivity improvement. The MGEEM provides no miracle cures for organizational problems. However, it does provide fundamental building blocks for a serious effort to measure and improve productivity in Air Force organizations. If there is a strong management commitment to improve performance in collaboration with members of the organization, rather than at their expense, this tool can be helpful.

3.1 The Decision to Begin

Once you have decided to begin the MGEEM process, your first task is to clearly frame in your mind the reasons why you feel productivity enhancement is essential to your organization. This step is necessary because you will have to articulate this rationale and "vision" to members of the organization many times as the MGEEM process unfolds. People are not enthusiastic about having their performance measured for its own sake. But, feedback on how people are doing is interesting to them, and its use, such as in setting up competition against themselves over time or against similar units throughout the command, can stimulate performance gains. People need compelling reasons for participating in the measurement of their performance. As a manager or commander, you must help your people understand why performance improvement can help the Air Force, why it can help your organization, and perhaps most importantly, "what's in it for them." There is considerable evidence that the most important phase of any productivity improvement effort is creating awareness at all levels in the organization regarding why it is important. As commander, this is your responsibility.

As you work through this phase of the MGEEM process, you should discuss your ideas with your vice commander, with your subordinates, and with the individual you select to be the measurement facilitator for the MGEEM implementation in your unit. Your vision must become a shared vision if it is to guide your organization to improved performance.

3.1.1 The Measurement Facilitator

To assist your organization in the implementation of the MGEEM, the services of a measurement facilitator are required. The measurement facilitator is generally someone external to your organization who is skilled in group process activities (e.g., running meetings, facilitating group discussions, interviewing, and listening) and who understands the basics of organizational performance measurement. Experience suggests that the combination of these two skills is critical to the success of the MGEEM. In Air Force organizations, such individuals might be found in roles such as management engineering technician, quality circles facilitator, human relations trainer, or in headquarters consulting organizations. The facilitator should become familiar with AFR 25-3, which is the governing regulation for the Air Force Productivity Enhancement Program. The glossary in this regulation will be especially helpful.

3.1.2 Implementation Manual

An MGEEM implementation manual (Tuttle & Weaver, 1986) has been developed by the Air Force Human Resources Laboratory (AFHRL) to guide the measurement facilitator in the process. This manual provides detailed step-by-step assistance and should be obtained from AFHRL/MO, Brooks AFB, TX 78235-5601 (AV240-3551).

3.2 Selecting the Target Organization

Where do you begin? This is a question which will immediately face each commander as he/she starts to implement the MGEEM. The short answer is to begin at the highest feasible organizational level over which you have control. If you are a squadron commander, then you should begin at the squadron level, defining the squadron as the "target organization." If you are a wing commander, then begin at the wing level. If you are a branch or detachment commander, then begin at that level. The MGEEM works best as a top-down rather than as a bottom-up process. This is because the principal intended accomplishments, one of the products of the MGEEM called KRAs, established at one organizational level serve as a framework for developing KRAs of subordinate level organizations. Top-down implementation allows organizations to ensure that their missions and, therefore, KRAs are in proper alignment.

3.3 Deciding What to Measure

Among the most significant contributions of the MGEEM is helping the members of the target organization decide what to measure. This is much more than a technical measurement decision. A management engineer could study your organization and suggest measures that might be better from a technical point of view. However, as a productivity improvement tool, this misses the point. Productivity is enhanced not because an organization has a good measurement system, but because it has the commitment of its people to improve the aspects of performance that are measured. The MGEEM is a methodology for helping organizations develop productivity KRAs and indicators that will build acceptance and commitment to the measures as they are developed. Participation by

organization members in the measurement development process, coupled with communication, are the key ingredients.

3.3.1 Develop Key Result Areas

The first stage of the MGEEM process is concerned with defining measurable facets of the organization's mission, labeled KRAs. KRAs are defined through the use of a structured group process technique known as the Nominal Group Technique (NGT). KRA development involves a 3-hour meeting led by the measurement facilitator. In this meeting, the "management team" of the target organization, augmented by the commander of the parent organization and one or more customer representatives, is led to consensus in answering the question:

"What results is this target organization expected to accomplish?"

3.3.2 Develop Productivity Indicators

For each KRA, the measurement facilitator then leads a second group, the "measurement development team," through a series of steps to develop efficiency and effectiveness indicators. Typically, the measurement development team consists of working level representatives of the target organization, in addition to the management team who participated in the KRA development process. Indicator development also makes use of the NGT in a group session to answer this question for each KRA:

"What efficiency and effectiveness indicators should the commander of this organization track on a periodic basis to tell if the KRA is being accomplished?"

Following these sessions (normally, two or three 3-hour sessions), there is a process of polishing and refining the indicators. This process involves the measurement facilitator and key organizational members. Through consideration of the importance and feasibility of each indicator, the set of indicators is reduced. For example, the measurement development team may suggest 20 to 25 indicators for consideration. The refinement process may reduce this number to 6 to 10 which are important and feasible to track on a periodic basis.

3.4 Implementing a Tracking System

Once the indicators are defined, it is necessary to develop a reporting system that provides periodic information to management and organization members. There are many possible reporting systems, and the organization should develop a simple one that meets its own specific needs. The MGEEM implementation manual, discussed in paragraph 3.1.2, describes such a reporting system. It enables the organization to set goals for each indicator and to aggregate indicators to derive a single productivity score for the entire organization. In addition, the suggested system permits management to differentially weight indicators according to their importance in arriving at an overall productivity score. The overall performance score and the individual indicator scores can be used to develop performance indices to assess productivity change over time. Whether this suggested system is used or not, its features are valuable in any tracking and reporting system.

3.5 Using the Results to Improve Productivity

Feedback of performance results is a powerful tool which can be used to improve performance. AFHRL has supported an extensive research and development (R&D) effort to identify practical guidelines for the use of feedback by Air Force organizations to improve and sustain performance and productivity. This section will briefly summarize the most significant lessons learned from this R&D. For more detailed treatment of this subject, refer to Pritchard, Bigby, Beiting, Coverdale, and Morgan (1981). A manual focusing on the use of feedback is in preparation.

3.5.1 What Should Be Fed Back?

The measurement information contained in the feedback report should cover all important aspects of the target organization's work. It should contain both overall scores and scores on sub-indices. The feedback report should provide quantitative information on performance for the period and it should specify "how good" that level of performance is in a qualitative sense. Finally, as previously discussed, indicator data should contain information on performance that is controllable from the target organization's point of view.

3.5.2 What Should Be the Source of Feedback?

The feedback report should derive from the organizational productivity measurement system developed by the MGEEM process. It should be produced in a hard-copy form (e.g., computer report) and be perceived as emanating from the supervisor or unit commander.

3.5.3 What Form Should the Feedback Take?

Feedback reports should be made public for the group whose productivity is being measured. This may be achieved by giving reports to all organization members or by posting the data in a conspicuous place where all members may view the results. The frequency of feedback depends on the nature of the work processes on which the measurement data are based. The rule-of-thumb is to provide feedback as frequently as the cycle time of the work permits. The feedback report should indicate how current performance compares with previous performance so that organizational members can see the changes that have occurred as a result of their efforts.

3.5.4 Linking Measurement to Group Problem Solving

Many Air Force organizations make use of formal or informal mechanisms to involve organizational members in problem-solving activities. These activities have labels such as advisory councils, quality circles, task teams, and labor-management committees. Regardless of the type of employee involvement process, however, it is helpful to have a mechanism that provides quantitative evidence of performance. The MGEEM fulfills this need.

The MGEEM measurement process deals directly with three issues that are usually serious weaknesses of most employee involvement efforts. First, how can persons involved in such efforts be sure that they select for study relevant problems that will help the organization? Second, how can management support for such work be maintained? And, third, how can persons in such groups demonstrate that their efforts pay off for the organization? All of these problems are effectively addressed by the MGEEM.

3.6 Evidence of the Effects on Productivity of the MGEEM with Feedback

AFHRL is sponsoring a multi-year test of the effects on organizational productivity of the MGEEM with feedback, goal setting, and incentive systems in an operational Air Force setting. The R&D is being conducted in four organizations (the Receiving, Storage and Issue, Pickup and Delivery, and Inspection sections) of the Materiel Storage and Distribution Branch of the Supply Squadron and the Comm-Nav section of the Maintenance Squadron, at the 67th Tactical Reconnaissance Wing at Bergstrom AFB, TX. The MGEEM was used to create KRAs and indicators for organizational productivity measurement systems. At the date of this writing, the R&D had progressed through the measurement of productivity in the baseline period and after the feedback enhancement. Results show improvement in organizational productivity of from 35% to 50%. Technical papers which document this research are forthcoming from AFHRL.

3.7 Costs and Risks Associated with the MGEEM

The major cost of the MGEEM process is the time of the commander and other participants. As with any management initiative, the commander and management team must attend the MGEEM sessions and show visible support for the process. This must not be delegated to subordinates. During the course of indicator development, the process could require up to 30 hours of the commander's time spread over a period of 4 to 12 weeks. The time requirements of other organizational members will be less than that of the commander, involving approximately 6 to 12 hours during the same time period.

Risks associated with the process include the possibility that measurement data will be misused. In the hands of an authoritarian manager, any measurement data could be used to "tighten the screws" on organization members. Although such a strategy may lead to short-term performance improvements, gains are likely to deteriorate over time as morale suffers.

A second risk is that data collected at the local organization level may be obtained by higher headquarters personnel who do not understand the associated limitations. If so, actions may be taken for the measured organization which are unwarranted.

Finally, measurement may serve to focus management attention on issues that previously received little attention. Attention may shift because the organization had been previously measuring the "wrong thing"; i.e., aspects of performance that were easy to measure but relatively unimportant. Or, the measurement process may point out to management aspects of performance that serve as a barrier to personnel in getting the job done (e.g., downtime of support equipment). This shift in focus may lead to a reallocation of resources which may be threatening to some personnel in the organization. However, if the organization measures the right things, such a reallocation should be of benefit to the organization.

3.8 Pitfalls to Be Avoided

As is the case with any management or performance improvement strategy, there are a number of possible problems. Most of these, however, can be avoided through judicious use of the technique. This section will draw on the authors' field experience with the MGEEM and from the research of Locke and Latham on goal setting (Locke & Latham, 1984).

3.8.1 Fear of Being Measured

Individuals often express fear or anxiety about the measurement of their performance, but these fears can be ameliorated. One such concern is the fear of failure. This can be dealt with by encouraging the group to set goals with productivity measurement data that are challenging but attainable. A second fear is repercussions from higher headquarters. This is often grounded in a past history of having been "called on the carpet" for a performance problem, inspection report, customer complaint, etc. The facilitator can reduce this fear by conducting the MGEEM procedure such that the next higher level commander is included in the KRA development process. This will help break down barriers and increase understanding up the line. Secondly, reports submitted up the line should be summary reports that do not provide detailed information on each indicator tracked. This reduces the potential for "micro-management" from above. For example, an agreement might be struck with the next higher level commander that reports submitted include only an aggregate performance index and show only change from a baseline period. This would provide a degree of insulation for the lower level commander, but still provide considerable accountability for results.

3.8.2 Goals as Ceilings

Goals are intended to serve as targets which encourage performance improvement. However, goals can operate as ceilings which discourage further effort once the target is reached. The key to avoiding ceiling effects is to establish in the organization an "ethic" of continual performance improvement. That is, regardless of the level of performance attained, there is an accepted need to make further improvements. However, unless this rationale is supported by "rewards" and "reinforcers" for excellent performance, this ethic will not be sustained. In most Air Force organizations, there is an ethic of high performance, but to sustain this ethic, commanders must seek new ways to recognize and reward members for high performance. The MGEEM process provides a means by which an organization can compete with itself over time. This is healthy if reinforced by the commander and can overcome ceiling effects associated with goals. Through competition, goals will be raised.

3.8.3 Non-Goal Areas May Be Ignored

In productivity measurement, it is axiomatic that "what you measure is what you get." Therefore, commanders and managers need to ensure that only important facets of organizational performance are measured. The MGEEM promotes this by forcing the indicator development process to take place in relation to KRAs. Therefore, use of the MGEEM makes it difficult to simply develop a set of indicators that are easy to measure and avoid important performance areas. At least, with the MGEEM, non-measured important areas will be identified.

3.8.4 Gaming the System

As with any measurement system, there is a potential for "gaming." Individuals are very creative with respect to means of "giving the boss what he/she wants to see." Controls for this tendency must attack the motivation to "fake" rather than attempt to make the system fake proof. Much of what has been said above deals with this issue. Reducing the fear of higher headquarters intervention, involving the organization in the development of the measurement system, and creating an ethic of continual performance improvement are all efforts to reduce the motivation to "game the system." If members of the organization feel that they "own" the system, there is less motivation to game it.

4.0 EFFICIENCY AND EFFECTIVENESS INDICATORS - SELECTED EXAMPLES

The MGEEM has been applied in a wide range of both military and civilian organizations. This section presents some of the indicators that have resulted from these applications. This section is presented to illustrate indicators that have been actually developed in operational settings. There is, however, no intention that an organization should adopt the indicators identified. It is a core premise of the MGEEM methodology that each organization should go through the process of developing its own indicators. It is ownership that is important. Ownership comes from having members of the organization participate in the measurement development process. The following indicators, expressed in ratio form, were actually developed participatively in operational settings:

4.1 Budget

- 4.1.1 $\frac{\text{Number of errors on mechanized reports submissions}}{\text{Number of mechanized reports submissions}}$
- 4.1.2 $\frac{\text{Number of hours of overtime in budget office}}{\text{Number of paid hours}}$
- 4.1.3 $\frac{\text{Number of dollars recommended for reprogramming that are approved by headquarters}}{\text{Number of dollars recommended for reprogramming}}$
- 4.1.4 $\frac{\text{Direct dollars of Operations and Maintenance (O&M) unfunded requirements that are funded locally}}{\text{Total direct dollars of valid unfunded requirements}}$

4.2 Supply

- 4.2.1 $\frac{\text{Dollar value of unreported excess material}}{\text{Dollar value of total inventory}}$
- 4.2.2 $\frac{\text{Average number of days to process requisitions}}{\text{Standard number of days to process requisitions}}$
- 4.2.3 $\frac{\text{Number of customer inquiries satisfied}}{\text{Number of customer inquiries received}}$

4.3 Housing Management

- 4.3.1 $\frac{\text{Number of families placed in housing}}{\text{Number of families requesting housing}}$

4.3.2 Number of dollars of revenue from transient housing*

Operating expenses for transient housing

4.3.3 Number of days family housing units are occupied*

Number of days available

4.4 Installation Maintenance and Repair

4.4.1 Number of delinquent service orders

Total number of service orders received

4.4.2 Number of square feet maintained*

Labor, capital, material, and energy costs of maintenance

4.5 Civilian Personnel

4.5.1 Total number of days to fill vacant positions

Number of vacant positions filled

4.5.2 Number of classification appeals sustained

Number of appeals filed

4.6 Contracting

4.6.1 Number of days to issue procurement solicitations

Total number of solicitations issued

4.6.2 Number of purchase requisitions processed

Number of elapsed days

4.6.3 Number of contract dollars to minority firms

Total value of contracts awarded

4.7 Base Administration

4.7.1 Number of times supplies not available

Number of requests for supplies

- 4.7.2 Number of pieces of equipment in use beyond life expectancy

Number of pieces of equipment in use
- 4.7.3 Actual number of hours worked on administrative job responsibilities*

Expected number of hours worked
- 4.7.4 Number of backlogged work orders

Number of work orders

4.8 Base Weather Detachment

- 4.8.1 Number of weather warnings/advisories with sufficient lead time

Number of warnings/advisories issued
- 4.8.2 Number of weather warnings that verify

Number of warnings issued
- 4.8.3 Number of late Officer Effectiveness Reports (OERs) and Airman Performance Reports (APRs)

Total number of OERs and APRs

4.9 Jet Engine Maintenance

- 4.9.1 Number of engine test cell rejects

Number of engines tested
- 4.9.2 Number of direct (production) hours

Number of indirect labor hours
- 4.9.3 Average number of days to return engine to serviceability*

Expected number of days to return engine to serviceability
- 4.9.4 Average time required to upgrade from 3 to 5 level

Command-wide average time to upgrade from 3 to 5 level

*Indicates those indicators that are classified as efficiency indicators. Efficiency as defined here refers to three types of indicators:

1. Those which relate actual inputs to expected or standard inputs (e.g., item 4.9.3);
2. Those which relate outputs to inputs (e.g., 4.4.2); and
3. Those which relate resource utilization to resource availability (e.g., 4.3.3).

Indicators not marked with * are effectiveness indicators. Such indicators measure goal attainment, quality, and impact on customers or other organizations.

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